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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,429	12/03/2001	Teemu Sipila	324-010624-US (PAR)	7529
2512	7590	06/27/2006	EXAMINER	
PERMAN & GREEN 425 POST ROAD FAIRFIELD, CT 06824			WONG, LINDA	
			ART UNIT	PAPER NUMBER
			2611	

DATE MAILED: 06/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,429

Applicant(s)

SIPILA, TEEMU

Examiner

Linda Wong

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

1. Applicant's arguments, see Applicant's Remarks, filed 4/19/2006, with respect to the rejection(s) of claim(s) 1-3 and 15-17 under Kakura (US Patent No.: 6754263) in view of Parr (US Patent No.: 5872816) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Chennakeshu et al (US Patent No.: 5371471).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-5,7-9,11-12,15-19,21-23,25-27,29,31** are rejected under 35 U.S.C. 102(b) as being anticipated by Chennakeshu et al (US Patent No.: 5371471).
 - a. **Claim 1**, Chennakeshu et al discloses determining a channel impulse response (Fig. 5, label 11), sampling a received signal (Fig. 5, label 7), selecting at least one channel coefficient or value from a matrix assuming a two ray channel (Col. 11, lines 12-22), wherein a two ray channel inherently comprises the direct and one alternately delayed path, thus at least one of the channel coefficients selected would be the most reliable path, determining a reference signal (Fig. 5,

output from label 13) using the at least one impulse response value (Fig. 5, output from label 11) and a symbol sequence assumed as transmitted (Fig. 5, label $r_{pre}[n]$ and Col. 16, lines 57-61), determining differential terms corresponding to the selected impulse response values for a sample of the received signal and reference signal (Fig. 5, labels 21,23, Col. 5, lines 25-54), applying the differential terms to a symbol sequence transition metric for searching for the symbol sequence (Fig. 5, labels 21,23 and Col. 5, lines 25-54 and Col. 6, lines 2-18) and forming a survivor path by adding the symbol sequence provided by the transition metric to the survivor path formed so far (Fig. 2a,2b, Col. 6, lines 20-40, lines 49-68, Col. 7, lines 1-15).

- b. **Claim 2**, Chennakeshu et al discloses at least one reference signal is determined using the selected impulse response (Fig. 5, labels 11 and 13) and at least one later impulse response value (Fig. 5, label 21)
- c. **Claim 3**, Chennakeshu et al discloses at least one reference signal is determined using only the selected impulse response value (Fig. 5, label 13 and Col. 11, lines 20-23).
- d. **Claims 4 and 5**, Chennakeshu et al discloses computing differential terms or path metrics using the impulse response values $h_0[n]$ and $h_1[n]$ (Col. 5, line 35), which indicates the differential terms or path metrics is dependent on the number of impulse response values. Thus, the number of path metrics would increase or decrease depending on the number of impulse response values.

- e. **Claim 7**, Chennakeshu et al discloses using the trellis diagram and maximum likelihood sequence (Fig. 2a and Col. 6, lines 2-40)) to select the sequence of symbols or path based on the value or magnitude of the path metric. (Col. 6, lines 2-40 and lines 49-68 and Col. 7, lines 1-15)
- f. **Claim 8**, Chennakeshu et al discloses selecting the maximum likelihood sequence depending on the path metric, which is calculated based on the channel impulse coefficients, thus the reliability of the channel impulse response is emphasized. (Col. 5, line 35, Col. 6, lines 2-40 and lines 49-68 and Col. 7, lines 1-15)
- g. **Claim 9**, Chennakeshu et al discloses calculating the path metric using Euclidean distance squared (Col. 5, lines 29-30) between the received signal sample and the symbol sequence assumed as transmitted and convolved with the impulse response values (Col. 5, lines 35-43).
- h. **Claim 11**, Chennakeshu et al discloses correlating the received signal sample and the symbol sequence assumed as transmitted and convoluted with the impulse response values. (Col. 5, lines 29-30)
- i. **Claim 12**, Chennakeshu et al discloses adding the path metric to the survivor path formed. (Col. 49-64 and Fig. 2a and b)
- a. **Claim 15** inherits all the limitations of claim 1.
- b. **Claim 16** inherits all the limitations of claim 2.
- a. **Claim 17** inherits all the limitations of claim 3.
- b. **Claim 18** inherits all the limitations of claim 4.

- c. **Claim 19** inherits all the limitations of claim 5.
- d. **Claim 21** inherits all the limitations of claim 7.
- e. **Claim 22** inherits all the limitations of claim 8.
- f. **Claim 23** inherits all the limitations of claim 9.
- g. **Claim 25** inherits all the limitations of claim 11.
- h. **Claim 26** inherits all the limitations of claim 12.
- i. **Claim 27** inherits all the limitations of claim 1.
- j. **Claim 29** inherits all the limitations of claim 9.
- k. **Claim 31** inherits all the limitations of claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 6,20,28,32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu et al (US Patent No.: 5371471) in view of Kubo et al (US Publication No.: 20030081702).

- a. **Claim 6**, Although Chennakeshu et al does not disclose the number of path metrics or branch metrics or differential terms is based on the length of the channel memory, Kubo et al discloses the memory length for the Viterbi algorithm is based on the length of the channel. (paragraph 0025) It would be

obvious to one skilled in the art to have the length of the memory based on the channel length to store the number of survivors, which depends on the length of the channel.

- b. **Claim 20** inherits all the limitations of claim 6.
 - c. **Claim 28** inherits all the limitations of claim 6.
 - d. **Claim 32** inherits all the limitations of claim 6.
3. **Claims 10,24,30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu et al (US Patent No.: 5371471) in view of Katsuragawa et al (US Patent No.: 5907586).
- a. **Claim 10**, Katsuragawa et al discloses calculating the path metric in the Viterbi decoder using either the Euclidean or Hamming distance. (Col. 8, lines 44-55)
It would be obvious to one skilled in the art to calculate the distance using the Hamming distance to produce appropriate distances so to determine the path or branch with the minimum cost so to determine the least costly path.
 - e. **Claim 24** inherits all the limitations of claim 10.
 - f. **Claim 30** inherits all the limitations of claim 10.
4. **Claims 13,14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu et al (US Patent No.: 5371471).
- a. **Claims 13 and 14**, it is obvious to one skilled in the art to use a computer, comprising components such as memory and software, to perform the method

Art Unit: 2611

of finding the optimum path. It would be obvious to one skilled in the art to use a computer to compute the method to provide a quicker result and more efficient method of determining the optimum path.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Linda Wong whose telephone number is 571-272-6044. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dac Ha can be reached on (571) 272-3040. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Linda Wong

A handwritten signature in black ink, appearing to read 'Linda Wong', with a horizontal line drawn underneath the signature.

**DAC HA
PRIMARY EXAMINER**